Spring 2004 Aerial Competition
Objectives, Scoring Methods, and Constraints

13 Feb 2004
Competition Objectives

• To design/build/fly an electric propulsion radio controlled aircraft to do the following:
  
  • Fly two laps around the Johnson track area, 30 points maximum. Lap scoring starts upon takeoff from the ground and ends upon landing after two complete laps.
    
    • Two pylons will be setup at opposite ends of Johnson. The planes must pass beyond and circle around the pylons.
    
    • Scoring algorithm:
      – Up to 1:20 - 30 points
      – 1:20 to 1:40 - 25
      – 1:40 to 2:00 - 20
      – 2:00 and over - 15
Competition Objectives (cont.)

• After completion of the second lap, the ground crew (not including the pilot) will load a cargo of 1 to 4 chicken’s eggs (supplied). The time required to re-prepare the aircraft for flight will be logged and deducted from the flight score.

• The aircraft must takeoff again and its flight duration will be measured. Flight does not have to be around pylons. Timing stops when the plane comes to rest or hits a fixed object and is unable to resume flight.

• Scoring:
  – One egg: 1 point/second
  – Two eggs: 1.5 points/second
  – Three eggs: 2 points/second
  – Four eggs: 3 points/second
  – 0 points for damaged cargo!
Constraints

- No limitations on wing span or area
- Motor battery: 350 mah, 8 cells NiCd (supplied)
- No hollowed out wings
- Standard 4-function radios and servos to be supplied
- Direct drive S-400 motors (no gearboxes)
- Selection of propellers to be provided
- Change processes: engineering changes to airframe must be documented and justified.
Tips and hints

- Design for robustness, reliability, stability and handling as well as aerodynamic performance
- Weight matters!
- Design by redesign and experience: schedule sufficient time to test fly and make necessary changes
  - Pilot familiarity
  - Ground crew operations
  - Hardware durability
  - Confidence in the System! (people, product, process)
Closing Thoughts

• “Community property” sharing
  – Tools, adhesives, numerous small parts
• See T A’s or staff immediately if radios or motors don’t work -- don’t disassemble the radio equipment!
• *PLEASE maintain a tidy workspace!*
• When in doubt, ask!